

Release Notes

Revision: 03

R&S[®] RTO Oscilloscope

Firmware Release 1.45.1.0

These Release Notes describe the following models and options of the R&S[®] Oscilloscope:

- R&S[®] Oscilloscope 1014, order no. 1304.6002.14 and 1316.1000.14
- R&S[®] Oscilloscope 1024, order no. 1304.6002.24 and 1316.1000.24
- R&S[®] Oscilloscope 1012, order no. 1304.6002.12 and 1316.1000.12
- R&S[®] Oscilloscope 1022, order no. 1304.6002.22 and 1316.1000.22
- R&S[®] Oscilloscope 1002, order no. 1316.1000.02
- R&S[®] Oscilloscope 1004, order no. 1316.1000.04
- R&S[®] Oscilloscope 1044, order no. 1316.1000.44
- R&S[®] B1 MSO option
- R&S[®] B10 GPIB interface
- R&S[®] K1 I²C/ SPI trigger and decoding
- R&S[®] K2 RS232/ UART serial decoding
- R&S[®] K3 CAN/ LIN trigger and decoding
- R&S[®] K4 Flexray trigger and decoding
- R&S[®] K11 I/Q software interface
- R&S[®] K5 I²S trigger and decoding

New Features and Improvements of V 1.45:

- R&S[®] RTO-K5: Trigger and decode for I²S audio signals
- Support for IQ-tar format used by R&S SW applications based on IQ data

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1 Revision History

Date	Rel. Note rev.	Changes
1.6.2010	1.0	First version for RTO firmware V1.0.0.0
7.7.2010	1.10.0.4	First firmware update RTO
25.7.2010	1.15.0.0	Release of R&S® RTO-K1 and R&S® RTO-K2
13.10.2010	1.15.1.0	Extended self test
12.1.2011	1.20.0.3	Release of R&S® RTO-K3
31.1.2011	1.20.1.2	Behavior of graphics driver update described correctly, version number corrected
27.4.2011	1.25.0.2	Smaller new features and solution for known issues
28.7.2011	1.27.0.3	Support for RTO 1002 and RTO 1004 and new probes
28.10.2011	1.30.0.25	Release of R&S® RTO-K4 and R&S® RTO-B1; support of differential probes
19.12.2011	1.32.0.16	Automatic mask generation, S/H measurements and measurement histograms
31.1.2012	1.35.0.2	Translation of serial bus addresses into names
10.4.2012	1.36.0.52	Release of R&S® RTO-K11
3.5.2012	1.36.4.14	Correction of device key handling
30.6.2012	1.40.0.66	New feature TV trigger
30.7.2012	1.40.9.1	Corrections sequence trigger and TV trigger
11.9.2012	1.45.1.0	Release of R&S® RTO-K5

2 Installation Information

2.1 Firmware Update

The normal firmware update for the R&S RTO is available as a single download from the Rohde&Schwarz web page <http://www.scope-of-the-art.com> or <http://www.rohde-schwarz.com>. The installation file is named “**Setup_Rto_V1.45.1.0.exe**”

CAUTION:

Updates from a firmware version below 1.20.0.3 to 1.20.0.3 or higher require an additional download file from the Rohde&Schwarz web page <http://www.scope-of-the-art.com> or <http://www.rohde-schwarz.com>. This installation file is named “**RTO-GraphicDriverUpdate-1.01.msi**”.

To check, if the latest graphics driver version is installed on the instrument, please change to the desktop of the instrument. The desktop is available by selecting the item “Minimize Application” of the “File” menu. Open the context menu of the main window with a right mouse click and select the menu item “Graphics Properties”. The following dialog box shall appear:



If the dialog box on the screen looks different to the one above, an old driver is installed.

Select the button “Options and Support”. A menu appears below. Select the item “Information Center” of this menu. On the right side a list of properties appears. The third property is titled “Driver Version:” Check the Version number. The latest driver has the version number 6.14.10.5303. Because older graphics driver versions may cause firmware crashes it is strongly recommended to install the latest version.

To check the installed firmware version please select “Setup” from the “File” menu and switch to the system tab. The firmware version is shown at the upper left corner of this dialog.

2.1.1 Preparing the Installation

There are several ways how to update the device after downloading the “Setup_Rto_V1.45.1.0.exe” installation file.

Using a memory stick:

1. Copy the file(s) to a directory of the memory stick and insert the memory stick into one of the USB sockets of the R&S RTO.

Using the remote desktop and copying the installation files to a directory of the instrument:

1. Connect the R&S RTO to your LAN.
2. Start the remote desktop on your PC (C:\winnt\system32\mstsc.exe).
3. Enter the TCP/IP address of the instrument, you want to update. Ensure that the "local resources" > "drives" option is selected and press the "Connect" button.
4. Login to the instrument (user name: "instrument" and password "894129" by default).
5. Copy the "Setup_Rto_V1.45.1.0.exe" and if required the "RTO-GraphicDriverUpdate-1.01.msi" from your PC to a new folder on the instrument.
6. You can now access this directory with the "Setup_Rto_V1.45.1.0.exe" from the R&S RTO firmware.

Using a network drive:

1. Connect your R&S RTO to your LAN, and establish a connection to one of your servers (Please ask you local IT administrator for support).
2. Copy the "Setup_Rto_V1.45.1.0.exe" and if required the "RTO-GraphicDriverUpdate-1.01.msi" from your PC to a directory on this server.
3. You can now access the directory with the "Setup_Rto_V1.45.1.0.exe" from the R&S RTO firmware.

2.1.2 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Switch the instrument on and wait until the Oscilloscope has resumed operation.
2. Ensure that the acquisition mode is not running. If the RUN CONT or the RUN Nx SINGLE key is shining green, press this key to stop the acquisition.
3. Press the SETUP key or select "Setup" from the "File" menu at the bottom of the screen.
4. Select the "System" tab.
5. The selected dialog box contains a box with the title "Select setup for firmware update". Press the Button "Open" within this box. A file selection dialog appears.
6. Change the path to the drive and directory which you prepared in the step 2.1.1 (USB stick directory, remote PC directory or directory on a server) and close the dialog with the "Select" button.
7. The installation starts and a new dialog box appears. Press the "Next" button to navigate to the selection of the firmware packages. By default all applications should be installed.

8. Press the "Install" button to start the firmware update.

The installation continues and the firmware is stopped. After a few minutes the system restarts automatically.

Depending on the previous firmware version, a reconfiguration of the hardware may be required during the first start of the firmware. In this case, a message box is displayed and the update of the FPGA starts automatically.

Do not switch off the instrument during this update!

After the update of the FPGA the instrument performs another restart automatically.

If a special FPGA update is required the instrument must execute a cold boot. In such a case, a message appears on the screen asking to switch off the instrument. Press the "Ok" button and wait until the instrument is switched off. Afterwards the instrument can be switched on immediately.

9. As mentioned above the upgrade of the RTO from a firmware version less than 1.20.0.3 (e.g. 1.15.x.x, 1.10.x.x or 1.0.x.x) to version 1.20.0.3 or higher requires an additional update. To check the installed firmware version please select "Setup" from the "File" menu and switch to the system tab. The firmware version is shown at the upper left corner of this dialog. If the version is less than 1.20.0.3 please install an additional firmware package for a graphics driver update:
 - a) Download the file "RTO-GraphicDriverUpdate-1.01.msi" from the RTO home page and copy it to the instrument or to a memory stick.
 - b) Stop the instruments firmware with the Item "Exit" of the "File" menu.
 - c) Start the windows explorer on the desktop of the RTO and navigate to the directory with the installation file "RTO-GraphicDriverUpdate-1.01.msi"
 - d) Double click on this file an wait until the installation is complete. This will take several minutes.
 - e) After a few seconds the instrument executes a reboot.
 - f) After the reboot an automatic installation will be started to setup the MS .net Framework. During this installation the instrument can not be used as a normal Oscilloscope. This installation take about 10 minutes. After this installation is complete an other reboot is executed automatically.
 - g) After the second reboot the graphics driver update is complete.
10. After the firmware update a self alignment is recommended. Select "Self alignment" from the "File" menu. Select "Start Alignment" to start the self alignment procedure.

A message box appears to indicate the running alignment procedure. Wait until this message box disappears. This will take several minutes.

Now the instrument is ready to use.

2.1.3 Performing the Firmware Update without a running oscilloscope application

If the firmware is not running when the firmware update shall be executed, the windows XP embedded explorer can be started. Change the path to the drive and directory which you prepared in the step 2.1.1. Make a double click on this file and proceed with step 7 to update the instrument firmware.

2.1.4 Firmware downgrade

A firmware downgrade is handled like a normal firmware installation with the following exceptions:

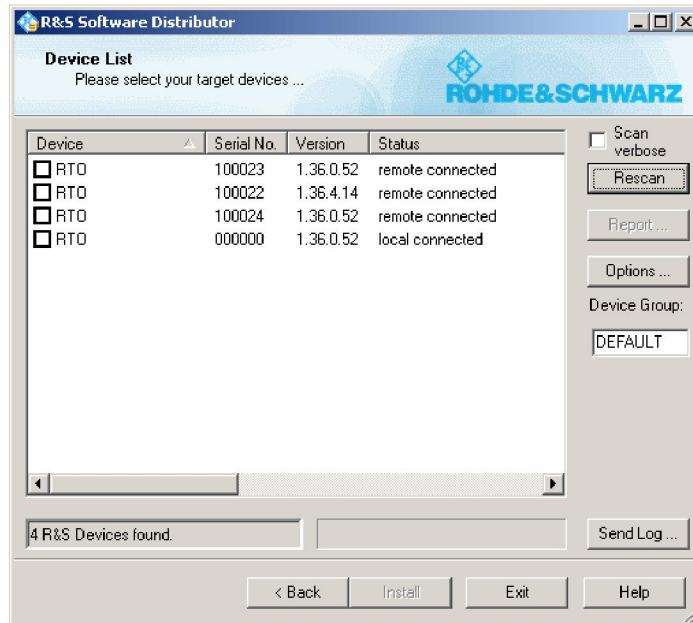
- Firmware downgrade from version 1.36 or higher to version 1.35 or lower

In that case the installer mode “remote installation” must always be used, even if a local installation on the instrument shall be done.

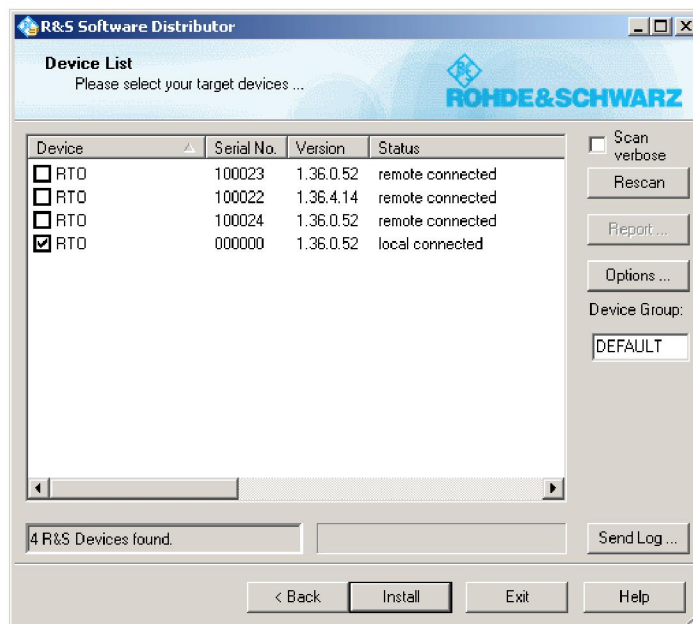
To select the “remote installation” mode please start the installation as mentioned above executing step 1 to step 6. Then the following installation window appears:



Please select the “Remote Installation” radio button and press the “Next” button to navigate to the selection of the firmware packages. By default all applications will be installed (see step 7 of the normal FW installation procedure). Press the “Next” button and a window like the following appears (the list of instruments depends on the R&S instruments found in your local area network) :



For installing the RTO firmware on the local instrument please select the instrument with the name “RTO” and the status entry “local connected”. Check that the serial number is correct.



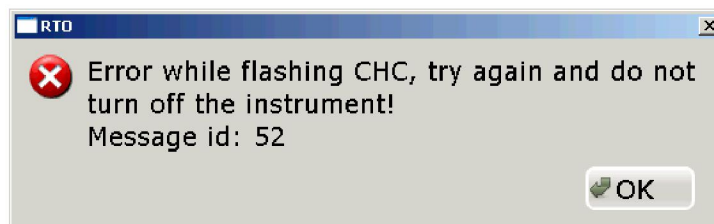
To continue with the firmware installation please press the “Install” button. This is step 8 of the normal firmware installation. All following steps are identical to the normal firmware installation. Please follow the installation instruction step 9 and following as mentioned above.

- **Firmware downgrade from version 1.40 or higher to version 1.36 or lower is not supported for instruments with new fan control**

This restriction is only valid for instruments with a new fan control. The allowed level of the new fan control can be checked in the following way:

1. Press the “File” menu and you will get the “Maintenance” dialog
2. Go onto the tab “Mainboard”
3. If the entry “PicoBlaze Version” is 5.0 or higher, it is not allowed to run a firmware version less than 1.40.

If you install version 1.36 or lower on instruments with the new fan control or if you plug in a hard disk containing an version 1.36 or lower the instrument does not work correctly. The following error message appears at startup:



Do not press the “OK” button. Connect a mouse and a keyboard to the instrument, change to the task manager and stop the Oscilloscope application named “RTO”. Proceed with the installation of firmware version 1.40 or higher without running the oscilloscope application as described in chapter [“Performing the Firmware Update without a running oscilloscope application”](#)

2.2 Installing Firmware Options

The firmware update includes all currently available firmware options. No additional installation is required. A firmware update has no side effects to firmware options already installed.

Only if new firmware option is bought, the instructions in this chapter need to be followed to enable it.

2.2.1 Enabling Options by Entering Option Key Codes

To activate application software packages, enter a license key for validation. The license key is in the device certificate or delivered as a part of the software package. The process is performed in the following steps:

1. Press the SETUP key. A dialog box appears. Select the “SW options” tab. The selected tab contains a box with the title “Install a new option”. There are two opportunities to install the option:

2. If a file including the option key is provided, select "Open" in the box with the title "Install from file". Navigate to the directory containing the option key file. Choose the file and click "Select".
If an option key number is provided double click on the data entry field with the title "Enter new option key". A key pad appears. Enter the option key number and press the "Enter" button.

After successful validation the message "option key valid" is displayed. If the validation failed, the option software is not installed.

If more than one firmware option need to be installed, this step needs to be repeated several times.
3. Reboot the device or restart the firmware.

3 New Functions

The following table lists the new functions and indicates the version in which the new function was introduced:

Version	Function
1.45.1.0	Release of R&S® RTO-K5. Track, long term and statistic function of measurements with decode values as a measurement source
1.45.1.0	Support for the export format IQ tar in R&S® K11. This format is used by R&S software applications working with IQ sampling data
1.45.1.0	Support of portable licenses
1.45.1.0	The R&S® Visa is part of the RTO firmware package and is installed with this firmware update automatically
1.45.1.0	Setup files can be exchanged between instruments with different firmware option equipment
1.45.1.0	The display configuration, resolution and number of displays, can be changed without a restart of the instrument firmware

4 Modified Functions

The following table lists the modified functions and indicates the version in which the modification was carried out:

Version	Function
1.45.1.0	The reset mode for measurements only affects the statistic evaluation used for long term measurement. In previous versions the reset mode also worked on the normal measurement statistic results. Statistic results will only be reset if the user changes instrument settings affecting the measurement results or if the user presses the "Reset now" button available at the control extension of the measurement result box or the measurement setup dialog box. Starting a new acquisition does not cause a reset of the measurement statistic.
1.45.0.1	The tab "Long term/statistics" on the measurement dialog box was renamed to "Long term/Track" and is reorganized. For the option R&S® K5 the track functionality was added.
1.45.1.0	The channel waveform export format "Raw (ADC direct)" saves the waveform samples in a signed 8 bit binary format. In previous versions it was saved in ASCII format converted from a signed 8 bit binary format
1.45.1.0	The step behavior for zoom position is dependent on the zoom window size. This allows the user to scan through the waveform step by step without any gap independent of the zoom window size
1.45.1.0	The step behavior for the zoom window size is now logarithmic. This allows a faster resize when a large record length is used

Version	Function
1.45.1.0	When switching off the cursor track waveform mode the cursor lines remain at the last position found by the track function. In previous versions the cursor lines were moved back to the position which was entered by the user before track was enabled.

5 Eliminated Issues

The following table lists the eliminated issues and indicates the version in which the issue was eliminated:

Version	Function
1.45.1.0	For the setup and hold measurement the reference level selection of the data signal is corrected
1.45.1.0	When using $\geq 50\%$ of the maximum record length display updates did not always work properly when scale settings were changed or when zoom windows were added

6 Known Issues

The following table lists the known problems and indicates the version in which the problem was observed for the first time:

Version	Function	Solution
1.30.0.25	R&S® RTO-B1: With resolution 200 ps the maximum record length cannot be reached without the memory option for analog channels (R&S® RTO-B101 / R&S® RTO-B102)	
1.45.1.0	Eye/Jitter measurement cannot be combined with measurement track	

7 Modifications to the Documentation

The new and modified functions mentioned in these release notes are already documented. Except the below mentioned last minute changes you can find the description including remote commands in the online help or in the manual. The manual can be downloaded from the internet under: <http://www.scope-of-the-art.com> or <http://www.rohde-schwarz.com>. Select "DOWNLOAD" and search for R&S RTO within the category MANUAL.

Last changes

no changes available

Appendix: Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new applications notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

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